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How to Recognize a Model When You See One. Or: Claudia Schiffer and the Climate Change

Patrick Sahle [*]

Abstract: *»Woran erkennt man eigentlich ein Modell, wenn man einem begegnet? Oder: Claudia Schiffer und der Klimawandel«*. "Model", at first sight, is a non-academic word with a wide circulation in a variety of conversational and non-technical written discourses. In, but also beyond that it is used in different situations, in different fields, by different disciplines. It changes its meaning in these respective contexts. But how far? If there remains a common conceptual core, we would learn a lot about the essence of the notion of model as a widely shared concept. If it turns out that the usage of the word makes model a homonym with completely distinct meanings, we have to sharply distinguish who is using it in which context. To further research these questions, we need to observe where and how we encounter models in our daily and scholarly life.

Keywords: Word and meaning, phenomenology, kinds of models.

1. Intro

"Model" is a notoriously hard concept to grasp. In looking back to the workshop that took place at Wahn Manor House in February 2017 and trying to connect the interdisciplinary, yet scholarly, discussion that happened there to the even wider scope of "real life", I will open up some rather loosely connected approaches or strategies to illuminate the possibilities and restrictions of a comprehensive perspective on models and modelling.[1]

2. Model is just a Five Letter Word

Words have a birth and then they grow up. They develop and change over time. Maybe they are like families. Words as family names. Over time, they branch out. Same name, different character. They split into polysems or are just metonyms. They may be used as homonyms. Sometimes we even nickname them teapots. Some words are like twins, which can sprout in different directions. In

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[1] For the context of this contribution see Ciula et al. 2018.

the end, they can even end up as antonyms.[2] Starting from one meaning, they can build a semantic distance up to the point where they seem to lose any common ground. Words and their meanings are formed by the context they move into and they are used within. Words are innocent; they are used and abused, formed and deformed, adopted and appropriated. We use them as we like. Our pleasure is to play with them. We are justified by the understanding that we share with our communication peers: as long as they see what we mean, decode what we send, we do nothing wrong. Across our own domains meaning differs, trenches grow. The family tree, the etymological connection, is not an explanation for the current/actual/present state of a word. It does not necessarily tell us something authoritative about its meaning. Yet we can only borrow, cultivate or educe words by building upon the meaning they bring with them to the here and now. There once must have been a common ground as a starting point. There must have been a commonality that grounded their development and that might have survived that evolution, that transfer. When we use the same words in different contexts with different meanings they still refer to that common base.[3] Maybe. In a stronger or weaker way.

Model is just a five-letter word that is used in various fields of life, in science and outside of science, and in different disciplines of scholarship. It is in such wide use that it is hardly ever defined formally or precisely. Moreover, if it is defined, the scope of the consensus regarding that definition is disputable. Still, what we are looking for is the remaining common ground: the shared meaning that we can find in uses of the word "model" in the various scholarly (and non-scholarly) domains. The common sense that explains the transfer (why did they adopt *this* word?) allows for some mutual understanding and asks for the productive refinement of our own deployment of the word – in the end the deployment of models and modelling, for example in the Digital Humanities (DH) and its neighbouring fields. Maybe this can be a starting point for those interdisciplinary and inclusive/integrative metamodels the metadiscipline DH is so much interested in.

[2] An example of a homonymic antonym from the German language is the word "billig". Originally signifying rightly, fair, reasonable, appropriate, just (like in the expression "recht und billig" – where it still persists!) it now stands for cheap, inferior, overly simple, tawdry, cheesy. One of the most obvious examples of homonyms in the English language that has developed in very different directions is "bank".

[3] Except for a coincidental homonymy without direct etymological connection. But as soon as you talk to scholars from Indo-European linguistics or other global-historical linguistics, you learn that there are no unrelated words.

3. Models in the Disciplines, Models in Situations

Real life situations, fields of discourse, and academic disciplines are operational communicative frameworks that provide for an advance in understanding. A default meaning addition. A tacit accord. A framework for reference: if you use "model" in *this* situation, I understand (or at least assume) that you mean *this* kind of model![4] Qualifiers, what linguists call determinants, are helpful in understanding the different notions and specializations of a word, but most often, they are left out of the local situation of communication. A word like "model" is used without qualifiers the more prominent, central, stable and clear its use is. Only in cross-field communication or if alternative meaning within one field exists is it necessary to specify the sense of the word.

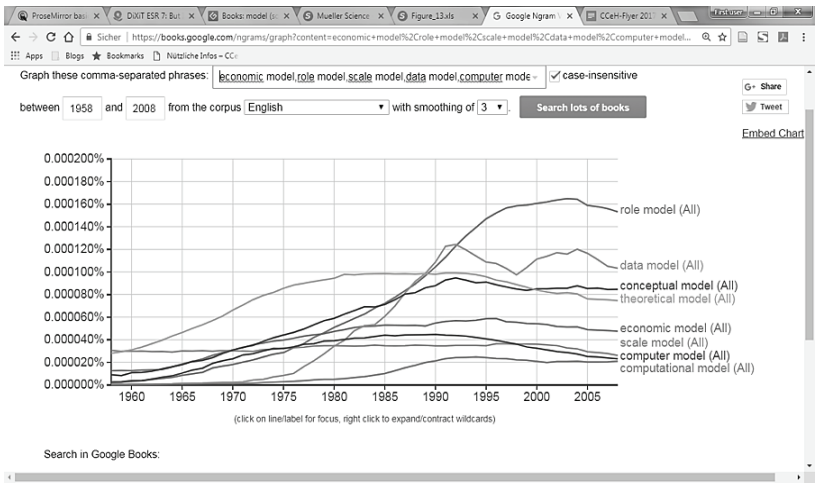
Empirical data on language usage is easier to obtain than ever. Lots of corpora are out there. The whole internet can be used as a corpus – if you take it as a source for sampling data that you maybe clean up a little bit. Tools like the Google Books n-gram viewer make use of such a corpus representing a more or less arbitrarily pooled corpus of our digitized written heritage as a mirror of our language usage. Despite all of the biases of its underlying data it suggest insights for the chronological development of the birth and growth of compound words in the domain of written books. A first harvest of compounds yields a wild collection of fruits like these: analytical model, architectural model, business model, causal model, cognitive model, computational model, computer model, conceptual model, data model, descriptive model, economic model, fashion model, formal model, graphic model, iconic model, internal model, logical model, mathematical model, mental model, object model, physical model, predictive model, process model, role model, scale model, scientific model, semantic model, social model, statistical model, structural model, transactional model, technical model, and 3D model.[5] While the use of some compounds is rather stable over time, others seem to show some trends as they gain or lose prominence.[6]

[4] "Football has become more athletic in the past decades" – without further specification this would usually refer to professional men's football as the default reference. If you want to talk about youth football or women's football, you have to add the specification.

[5] One of the simpler approaches is the use of the "Corpus of Contemporary American English" (COCA), see <https://corpus.byu.edu/coca>.

[6] The graphic shows the Google Books Ngram Viewer results as of November 15th, 2017, data for 1958 to 2008, corpus of English, smoothing factor 3, words economic model, role model, scale model, data model, computer model, conceptual model, theoretical model, computational model. Note that in a next step of enquiry we could ask for changes in the meaning of the words by looking at their definitions or co-occurring concepts to see whether and how they become simpler, or more complex, neater, more controlled and canonized.

Figure 1: An Unreliable Impression of the Prominence of Words and Concepts



The mere collection of words do not lead to a classification or taxonomy as these words signify different ontological layers. They operationalize different perspectives. Some instances of the word model above ask for a property (an iconic model has to have a visual representation), some relate to processes or goals (like a business model). Some of them can be grouped (conceptual, theoretical), some divide a perspective (physical versus conceptual), some address domains (fashion). It should be possible to map the words or put them onto a coordinate system – maybe with abstraction and domain specificity as axes.

The question remains: Is there a common ground shared by these compounds? Where are the borderlines of meaning? Where is inclusion, where is exclusion? A fashion model is not a conceptual model. But a conceptual model can also be an iconic model. And a fashion model is an icon! Some domains are rather distinct and seem to exclude other notions. If you claim that models should only be structural or mathematical models, it follows that the use of the word model in other circumstances is plain wrong, as they are not models in this sense.[7] But as we often don't have clear definitions; notions are most often made up of a fuzzy set of meanings. There will be partial overlap between these meanings. Thus, we have to ask which of these partial meanings are comprehensive and which are exclusive? An important property of models in the sciences is the possibility of giving a formal notation to them, while other domains do not need formalization or are uninterested in pursuing it. Are we only lacking a routine of formal description for all kinds of models, taken to-

[7] "Such structural models sensu stricto exist only in logic and mathematics" - Günther Görz (2018, in this HSR Supplement), p. 164.

gether? While a narrow understanding may exclude models that have no formal notation, would it have to integrate them as soon as we have found that formal language?

There are some formal languages out there: mathematical formula, Unified Modelling Language (UML), entity-relationship models (ERM), various XML schema languages etc. But are they really universal? Or only applicable to certain domains, realizing only a certain view on modelling? How can we find the commonalities in understandings of modelling if notation systems are already too specific and exclude most cases where the term model is used? Regarding distinction and overlap, maybe we can look for:

1) The practical and theoretical use of "model" in certain domains or disciplines.
2) Interdisciplinary approaches toward the understanding of overlap between them
3) Metamodels that integrate as many disciplinary aspects as possible (within their scope of interest).
4) Underlying common sense understandings of properties of modelling.

To understand better the proliferation of meaning as well as common roots and references, I would like to propose a phenomenological approach and an empirical experiment: where and how do we encounter models, not only in our academic, but also in our "normal life"?

4. Models in the Wild

One morning at the breakfast table I say to my son (14 years): "Boy, as you go out and spend your day, could you please watch out for models, collect them and bring them home for me?" This might be a small selection of what he would report for a typical day:

1) Reading the newspaper at the breakfast table, I saw an advertisement with a fashion model. Claudia Schiffer, acting as a model, advertising a fancy dress. A model in flesh and blood?
2) On my way to school, my friend pointed to a car passing by: "look, the brand new BMW model". An instance of a model?
3) In a mathematics lesson, I was asked to answer a word problem: "Please solve this exercise by modelling the situation with a quadratic equation," the teacher said. A model as an abstract description of a part of the world?
4) In a history lesson, we saw a diagram of feudalism as a model for the organisation of power and governance in the middle ages. We learned that vassalage is a central concept in that model – a word that I had never heard of before. A model as the supposed structure of a past society?

5) In a German lesson, we talked about "Wilhelm Meister's Apprenticeship", a novel by Goethe. It was said that this follows the model of the "Bildungsroman". I had the impression that what the teacher wanted to talk about was not the novel itself, but the question of literary genres. A model as a classification of types of (literary) art?
6) In a politics lesson, we had to discuss the model of "representative democracy" as we examined the German political system in comparison to others. A model as a blueprint for a political system?
7) In a geography lesson, we worked with different kinds of maps presenting models as simplified and systemised representations according to certain views of the world. A model as a visual scheme of geographical relations?
8) When I had to go to the toilet facilities during a break, I recognized the dichotomous nature of our gender model by the two icons on the doors. A model as an icon become conventional?
9) In my free time in the afternoon, I assembled a scale plastic model of a space shuttle. A model that can fit in my pocket?
10) After that, I ordered something at an online shop. I wondered what model lay behind the system that organized its data and processes. A model as information architecture?
11) At the end of the evening news, there was a weather forecast based on meteorological models. The weatherman said that the upcoming weather would be much too warm for the season but that it would match models of ongoing climate change. A model as a prediction of the future of our planet?

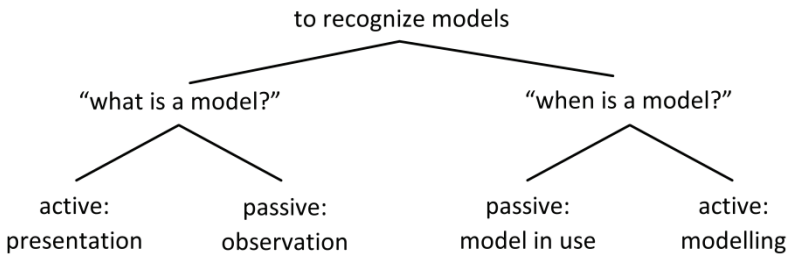
In all of these situations, we find models in very different senses of the word. In different "behaviours" and functions. In different relationships to the world that is modelled and to the world where objects as instances may refer back to these models. For every given case, we could discuss in which way the respective model *is* a model, *acts like* a model or *is used* as a model.

5. How to Recognize a Model

What can we learn from that? Models occur in situations; they are presented as models, recognized as models or underlie things we engage with. Models can be observed as themselves or by their effects. Models can take many forms and shapes or be of different substances. They can be made of plastic or metal, or flesh and blood. Paper that carries diagrams. Drawings, icons, symbols. Some are word based: narration or explanation, or verbal description. Some are abstract concepts: equations, formula, or formal notations. Mental models in the strict sense are even hidden in people's brains. These are models, we cannot talk about (unless we do) but could observe them by their effect (like the be-

haviour of these people). The relationship between world, model and instances of the model that we observe move in at least two directions: sometimes we see something as an instance or an effect of a model. Sometimes we see the model itself, representing something. In these situations, we recognize the model. In others, models present themselves more actively. Overall, we may not only ask what a model is, but also when it is. It seems there are four basic situations in which we encounter models.

Figure 2: How to Encounter Models



6. Semantic Fields

Back to language. In all situations, using the word model to describe what we have or which effects we can observe points to some semantic characteristics. Sometimes words have neighbours. Words with close meaning, synonyms, and replacements to avoid repetition. They share partial meaning and at the same time add further explanation. Exploring this neighbourhood can reveal meaning. But we have to keep an eye on the differences to get a sharper image. We may ask which words fulfil these sentences: "a model is a kind of …" or "a model is like … - but different".[8] This is my first collection: A model is sometimes like a definition, an explication, an explanation, an interpretation, a generalisation, an abstraction, a description, a depiction, an image, a drawing, a diagram, a visualisation, a symbolisation, an icon, a map, a (critical) representation, a reproduction, a miniature, a replica, a mock-up, a simulation, a function, a system, a tool, a draft, instructions for constructing something, a method for organizing knowledge, an experiment, an example, an ideal, a specimen, a type, a prototype, an analogy, a metaphor, a paradigm, a pattern, a structure, a theory, a concept. If we go through all of the potential pairs and ask ourselves, what is the difference between these words and "model", we should come up

[8] See McCarty (2004) and Goodman (1968, 171) for similar approaches.

with a rather precise description of what model actually means and what it doesn't.

Another helpful approach might tackle the problem from the opposite direction. Learn from the counterpart. Maybe the common core meaning lies in the distinction. Good definitions tell things apart. They explain what is "specific" about a thing. Can we tell what models definitely are not? Although models certainly are not most of the things or concepts in the world, the outcome of a first unsystematic survey was rather poor. What we can say, however, is that the model is neither the modelled object (or a part of the world) nor an instance based on the model. But this elementary difference is true for many other things.

Maybe there is no connection between Claudia Schiffer and Climate Change as they are models representing an understanding of the term and concept as it has evolved in different directions. Maybe there is a connection as they still share some basic properties, since they relate to certain domains in the world and as they explain something – even with predictive power.

7. Back to Basics

To find a common core in the understanding of the concept of "model", we have to look for commonalities. Trivialisation may be the prize we have to pay for this. But trivialisation is only the backside of the medal where extreme abstraction is the more shiny one that may enlighten our navigation through the landscape of models. Are there properties that all types of models share? That are shared in all domains and by all understandings?

As the model is not the modelled object or domain, we use models to refer to something, to talk about something else, to show, to simulate something else. A model stands for something. It is a placeholder, a proxy. Furthermore, models are a means for understanding, communication, and exchange. For testing, analysing, producing something. To this end, they have to fulfil some minimal requirements: Models must be either smaller, less detailed or more abstract than ... . They must be idealized and de-individualised.[9] They must contain entities, properties of elements and relationships between elements in a way that relates to the modelled object.

On this basis, we can see that even Claudia Schiffer and climate change are things of the same type.[10] Both are examples of models. Claudia Schiffer is (or was) a fashion model while models of climate change refer to global patterns of weather. Both stand for something else and are abstractions – of other "real

[9] On the aspect of idealisation see for example Morgan and Knuuttila (2012).

[10] For a more thoughtful approach towards clustering of models and common properties see the contribution by Lattmann (2018, in this HSR Supplement).

women" and of "weather that can be observed". Both present a scenario that is based on idealisation. Both can be seen as icons. But what about formalisation? Both kinds of models operate with measures and numbers! Maybe, in the end, the only difference is in the degree of formalisation and explicitness. Climate models are highly formalised while fashion models as real persons are obviously very explicit. On the other hand, even for Claudia Schiffer, a formal description of properties and measures can be given to explain why she was chosen to act as a model and how she relates to the modelled part of the world. We could even say that both models are similar in their predictive purpose and force: "the weather *will* be like this …" – "people *will* buy this dress …". And both predictions are purely statistical!

8. Outro

Our concerted workshop tried to assemble and contrast views on models and modelling from different perspectives within academic discourse. Although STEM and life sciences were underrepresented or not represented at all (with the exception of computer science and mathematics), the differences already seemed to dominate over the common ground. Some participants might have felt out of place. They thought the workshop would be about models in the digital humanities and that could only mean "data models" – while others were not interested in explicit formal models at all. In this seeming misunderstanding, the workshop proved useful and productive. It revealed the differences, trenches and gaps between academic disciplines that initially seemed to be positioned relatively close to each other. We could now conclude that every field has its own understanding and its own model of model and modelling. That it would be best to leave them alone in following their own agenda to reach their own respective goals. Maybe an understanding of models as icons is useless in computer science where algorithmic solutions are needed. Maybe formal mathematical models do not help literary scholars in conceptualizing close reading and interpretation. But to me, it is exactly in the differences and the apparent incommensurability of the various perspectives that good starting points to think about mutuality and to look for the common ground between disciplines can be located. If we see how diverging practices rely on common principles and how different fields have turned them into successful strategies, maybe we can develop a new and fruitful methodology for modelling across the disciplines. And this is, what Digital Humanities is about: we have to create metamodels all the time to make concepts and methods from the humanities operational by using approaches from engineering and computer science. We need to bridge the seeming gap between these worlds and to do so, we must understand their respective foundations.

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